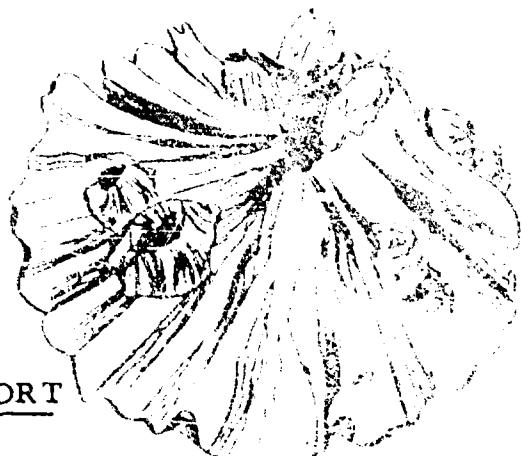


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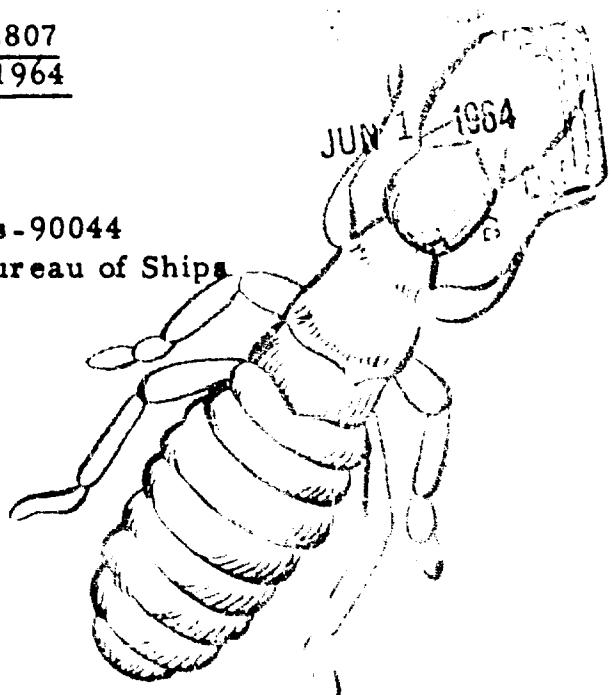
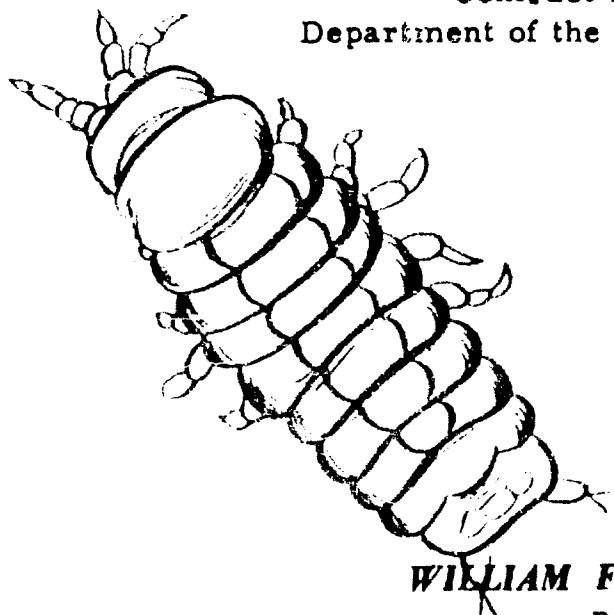
FINAL REPORT

AFRICAN WOODS

Parinarium sp. - Liberian Pine - African Oak - African Wishmore

Report No. 12807
February 24, 1964

Contract No. NObs-90044
Department of the Navy, Bureau of Ships



WILLIAM F. CLAPP LABORATORIES, INC.
DUXBURY, MASSACHUSETTS

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See also:

William F. Clapp Laboratories, Inc. Report No. 12230, May 31, 1962
12316, April 9, 1963

The William F. Clapp Laboratories, Inc. received from the New York Naval Shipyard several planks of Liberian Pine, African Oak, African Wishmore and Parinarium sp. to be cut into test panels for the evaluation of marine borer resistance and compatibility with Navy anti-fouling coatings. Twelve test panels, measuring 4" x 14" x 1", were obtained from each species of wood for a total of 48 panels for the entire test series.

Three panels of each species were painted with two coats of Formula 103 anti-fouling paint; three were coated with two coats of Formula 131 anti-fouling paint, and six panels of each species were left unpainted.

These test panels were mounted on three replicate racks, 16 panels to a rack, and submerged at Wrightsville Beach, North Carolina on December 20, 1960 by personnel of the William F. Clapp Laboratories.

The following notes are the result of the final inspection made on October 1, 1963, at which time all of the panels were removed from test:

RACK 1

Panel #	Species	Coating	*F. R.	Remarks
1	<i>Parinarium</i> sp.	None	0	Numerous abortive <u>Bankia</u> , few Pholads.
2	"	"	0	Numerous abortive <u>Bankia</u> , few Pholads.
3	"	105	7	Paint peeling & cracking badly, eroding moderately, 75% gone. Few abortive <u>Bankia</u> .
4	"	121	9	Paint intact. No apparent attack.
5	Liberian Pine	None	-	Destroyed, June 1962.
6	"	"	-	
7	"	105	7	Paint peeling & cracking badly, eroding moderately, 45% gone. No apparent attack.
8	"	121	7	Paint intact. No apparent attack.
9	African Oak	None	0	Nearly filled by <u>Bankia</u> .
10	"	"	0	" " "
11	"	105	8	Paint peeling & cracking slightly, eroding moderately, 35% gone. No apparent attack.
12	"	121	8	5% of paint mechanically abraded off. Remainder of paint intact. No apparent attack.
13	African Wishmore	None	-	Destroyed, June 1962.
14	"	"	-	
15	"	105	8	Paint peeling & cracking badly, eroding moderately, 35% gone. No apparent attack.

Panel #	Species	Coating	EF. R.	Remarks
16	African Wishmore	121	8	5% of paint mechanically abraded off. Remainder of paint intact. No apparent attack.

Panel 2

17	<i>Marinaria</i> sp.	None	0	Numerous abortive <u>Bankia</u> , few small Pholiads.
18	"	"	0	Numerous abortive <u>Bankia</u> .
19	"	105	7	Peeling & cracking badly, eroding moderately, 40% gone. Several abortive <u>Bankia</u> , few small Pholiads.
20	"	121	8	Peeling & cracking slightly. No apparent attack.
21	Cibolian Pine	None	-	Destroyed, November 1961.
22	"	"	-	"
23	"	105	9	Peeling & cracking badly, eroding moderately, 30% gone. No apparent attack.
24	"	121	9	Paint intact. No apparent attack.
25	African Oak	None	0	Nearly filled by <u>Bankia</u> .
26	"	"	0	"
27	"	105	7	Peeling & cracking slightly, eroding moderately, 25% gone. No apparent attack.
28	"	121	8	Paint intact. No apparent attack.
29	African Wishmore	None	-	Destroyed.
30	"	"	-	"

Panel #	Species	Coating	•F. R.	Remarks
31	African Widdmore	105	8	Paint peeling & cracking badly, eroding moderately, 10% gone. No apparent attack.
32		121	7	10% of paint mechanically abraded off. Remainder of paint intact. No apparent attack.

R.A.C.R. 3

33	<i>Parinarium</i> sp.	None	0	Few abortive <u>Bankia</u> .
34			0	
35		105	6	Paint peeling & cracking badly, eroding moderately, 60% gone. No apparent attack.
36		121	7	Paint intact. No apparent attack.
37	Iberian Pine	None	-	Destroyed.
38			-	
39		105	7	Paint peeling & cracking moderately, 2% gone. No apparent attack.
40		121	7	Paint intact. No apparent attack.
41	African Oak	None	0	Nearly filled by <u>Bankia</u> .
42			0	Filled by <u>Bankia</u> .
43		105	8	Paint peeling & cracking moderately, eroding moderately, 3% gone. No apparent attack.
44		121	9	Paint intact. No apparent attack.
45	African Widdmore	None	-	Destroyed.
46	"		-	

<u>Panel #</u>	<u>Species</u>	<u>Coating</u>	<u>O.H. R.</u>	<u>Remarks</u>
47	African Wiphure	100	6	Paint peeling & cracking moderately, erosion moderately. No apparent attack.
48		121	7	Paint intact. No apparent attack.

*O.H. R. = Floating Rating

Key to floating rating: 10 = clean
0 = completely fouled

SUMMARY

This test, installed December 20, 1960, was concluded on October 1, 1963 after 33 months duration.

Uncoated Panels

The initial marine borer attack occurred between 6 and 12 months after installation on all panels and consisted of mostly Bankia (Bankia gouldi), with some attack by Pholade (Martesia striata). No Lymnaea attack was observed. Untreated Southern Yellow Pine panels submerged at the same location during 1961 showed that there was no attack by Bankia during that year prior to June, at which time a heavy infestation occurred, continuing to October when the attack ceased.

At the time of the December 1961 inspection, when Racks 1 & 2 were examined, the Liberian Pine and Wiphure panels were either filled or destroyed by Bankia, the African Oak panels were heavily attacked at both ends, and the Parianium panels showed a few to several small Bankia.

At the end of the test all the Liberian Pine and Wiphure panels had been destroyed by Bankia and all the African Oak panels were nearly filled by Bankia. All

the Parinarium panels were sound, with few to numerous abortive attempts by Bankia and a few small Pholads.

Coated Panels

All panels coated with Formula 121 anti-fouling paint remained intact and the paint coat remained serviceable and retained its anti-fouling properties for the entire 33 month period. The Liberian Pine, African Oak and Wishmore panels coated with Formula 103 anti-fouling paint remained intact. The paint coat itself remained serviceable and retained its anti-fouling properties for the entire 33 month period. Two of the three Parinarium panels coated with Formula 103 anti-fouling paint were attacked by low to several abortive Bankia and a few small Pholads. On the Parinarium panels the Formula 103 paint retained its anti-fouling properties to the end of the test period but failed as a coating at 24 months.

The results of this test would tend to indicate that:

1. Uncoated Liberian Pine, African Oak and Wishmore show little native resistance to marine borers.
2. Uncoated Parinarium was sufficiently resistant to marine borer attack to merit further consideration for marine use, but the length of this test, 33 months, was not sufficient to warrant a comparison of Parinarium with other resistant woods such as Greenheart.
3. Navy Anti-fouling Formula 121, when used with all four woods tested, showed a life of at least 33 months, both as a protective coating and as an anti-fouling agent.
4. Navy Anti-fouling Formula 103, when used with Liberian Pine, African

Oak and Wishmore, showed a life of at least 33 months, both as a protective coating and as an anti-fouling agent.

b. Navy anti-fouling Formula 103, when used with Parinarium, showed a coating life of 24 months, although the remaining paint retained its anti-fouling properties for the 33 month period.

It is felt that although the length of this test was sufficient to evaluate the woods Siberian Pine, African Oak and Wishmore relative to native resistance to marine borers it was not long enough to completely evaluate Parinarium as a marine-borer resistant wood.